Environment and Natural Resources Trust Fund
2015 Request for Proposals (RFP)

Project Title: MGS Geologic Atlases to Support Natural Resource Management [Continuation]

ENRTF ID: 001-A

Category: A. Foundational Natural Resource Data and Information

Total Project Budget: $ 2,040,000

Proposed Project Time Period for the Funding Requested: 3 years, July 2015 - June 2018

Summary:

Accelerates a long-term effort to provide Part A County Geologic Atlases statewide. These atlases provide maps and data essential to wise use and protection of water resources.

Name: Dale Setterholm

Sponsoring Organization: U of MN - MN Geological Survey

Address: 2642 University Ave W
St. Paul MN 55114

Telephone Number: (612) 627-4780 x223

Email sette001@umn.edu

Web Address http://www.mngs.umn.edu/index.html

Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

A map of atlas progress statewide and a graph of funding levels and sources.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage		_____ TOTAL

PROJECT TITLE: MGS Geologic Atlases to Support Natural Resource Management

I. PROJECT STATEMENT

Geologic atlases provide maps and databases essential for improved management of ground and surface water resources. This is foundational data that supports water management activities to the benefit of drinking water and aquatic habitat. County Geologic Atlases are specifically identified as essential data in the Statewide Conservation Plan, and in the efforts of the Environmental Quality Board, DNR Waters, and the Water Resources Center at the University of Minnesota to design a sustainable water management process. They define aquifer boundaries and the connection of aquifers to the land surface and to surface water resources to enable a comprehensive water management effort. The program goal of atlas coverage statewide has benefited from long-term support of LCCMR to accelerate the work.

A complete geologic atlas consists of Part A constructed by the Minnesota Geological Survey (MGS) and focused on geology and the County Well Index, and Part B constructed by the DNR Division of Waters (funded separately) and focused on hydrology. Local participation is a primary factor in determining which counties are chosen for this work, while ground water sensitivity, water demand, and the size of the population served are also considerations. The counties are required to provide funds or in-kind service.

Atlases enhance natural resource management and regulation, and facilitate wise use of water resources. They support water management activities for sustainable water use and protection and improvement of water quality such as: permitting, land use planning, wellhead protection, remediation, nutrient management, monitoring, modeling, and well construction. Atlas information is used by citizens, local government, counties, and state agencies (SWCDs, MDH, DNR, MPCA, Ag). The atlases document existing conditions so that changes in the water system can be recognized and evaluated. A User's Guide to geologic atlases supports and educates users of all backgrounds.

This project continues an effort to provide county geologic atlases statewide. The first atlas was initiated in 1979. Funding from ENRTF in the early 1990s and from 2007 to the present has greatly accelerated production (see attached map). At this time 37% of the state has a completed Part A atlas, or a project underway. Annual funding of $1,750,000 (aggregate from all sources) would achieve statewide coverage in about 14 years.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: Initiate about 5 new county geologic atlases **Budget: $2,040,000**

Atlases begin with compilation of a database of subsurface information. The most abundant data source is the construction records of water wells. With the cooperation of the local project partner, accurate digital locations are established for these wells to support their use in mapping. Concurrently, geologists visit the project area to describe and sample landforms, and exposures of rock or sediment.

An initial assessment of the geologic data is then completed to focus additional data gathering including shallow and deep drilling programs and geophysical and geochemical surveys. Analysis of the complete data set is then completed and maps and associated databases are formalized and prepared for use in geographic information systems and distribution via DVD and web. Most of the products are also printed for use in the field, and by users who prefer this format. The number of counties we can map with these funds will be affected by the size, geologic complexity, and data availability of the counties that are chosen.

Outcome	Completion Date
1. Create database of well construction records to support the mapping, to document water use in specific aquifers, and to help resolve well problems	June 30, 2017
2. Complete any unfinished ENRTF supported County Geologic Atlas projects in progress (ex; from 2013 appropriation).	June 30, 2017
3. Make progress on maps of bedrock geology, surficial geology, subsurface Quaternary geology, bedrock topography, and thickness of glacial deposits.	June 30, 2018

III. PROJECT STRATEGY

A. Project Team/Partners

The MGS team will include as many as 20 staff members including database specialists, geologists, geophysicists, geographic information system specialists, and an editor. The total cost (including fringes) of an average FTE at MGS is about $83,802. A typical county geologic atlas requires approximately 4 FTE to complete. After completion of the MGS work DNR will construct Part B of the atlas which addresses water levels, water chemistry, and sensitivity using separate funding. The local partner, typically a county or SWCD, will provide services, such as establishing accurate well locations. The local partner is also consulted in the project design phase to establish specific issues, needs, and preferences. The exact products and map scales are chosen to fit the geologic setting and the data available.

B. Project Impact and Long-Term Strategy

MGS is the geologic mapping agency of the state and is striving to provide comprehensive geologic mapping and associated databases at appropriate scales statewide as quickly as possible. The County Geologic Atlas program is the primary vehicle for completing this goal. Atlases are complete or under construction for 42 of the 87 counties in Minnesota. The MGS receives about $250,000 per year from DNR Waters, and also leverages federal cost share dollars from the National Cooperative Geologic Mapping Program of the United States Geological Survey. MGS competes for these cost share dollars annually and they cover half of the costs of each map product incurred in that one-year window. MGS intends to propose project map elements for cost share and if successful may garner an additional $125,000. MGS atlas development is also supported by Clean Water Funds ($305,000 from July 2010 to June 2013; and $1,230,000 from July 1, 2013 to June 30, 2018). The attached chart of recent and future funding of the program illustrates how ENRTF and CWF appropriations have increased activity to a level of approximately $1,750,000 per year. At this level of spending statewide coverage and updating of several existing atlases could be achieved in approximately 14 years.

C. Timeline Requirements

The work associated with this project will be initiated in 2015 and continue for three years. Most atlases require 3 to 4 years to complete, so projects started in this proposal may not be completely finished and may require additional funding. In the first year well locations are established and field work on the surficial geology is started. In the second year the bulk of field work is completed, drilling is completed, and map compilations begin. In the third year map and database compilations are completed and prepared for printing and GIS distribution, including web access. Workshops are held to familiarize the public and other users with the products after printing is complete. The funding level of this proposal is sized to continue the overall funding level of atlases at the MGS sufficient to complete 5 counties per year, and covering the entire state by about 2027. Overall funding includes funds from DNR, federal cost-sharing funds, ENRTF funds, and Clean Water funds in aggregate of $1,750,000 per year.

2015 Detailed Project Budget

Project Title: MGS County Atlases to Support Natural Resource Management

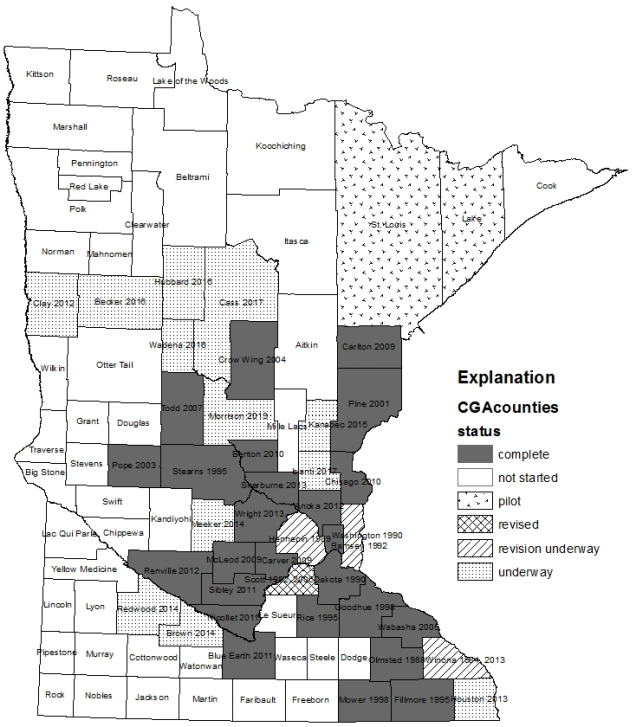
IV. TOTAL ENRTF REQUEST BUDGET *3* **years**

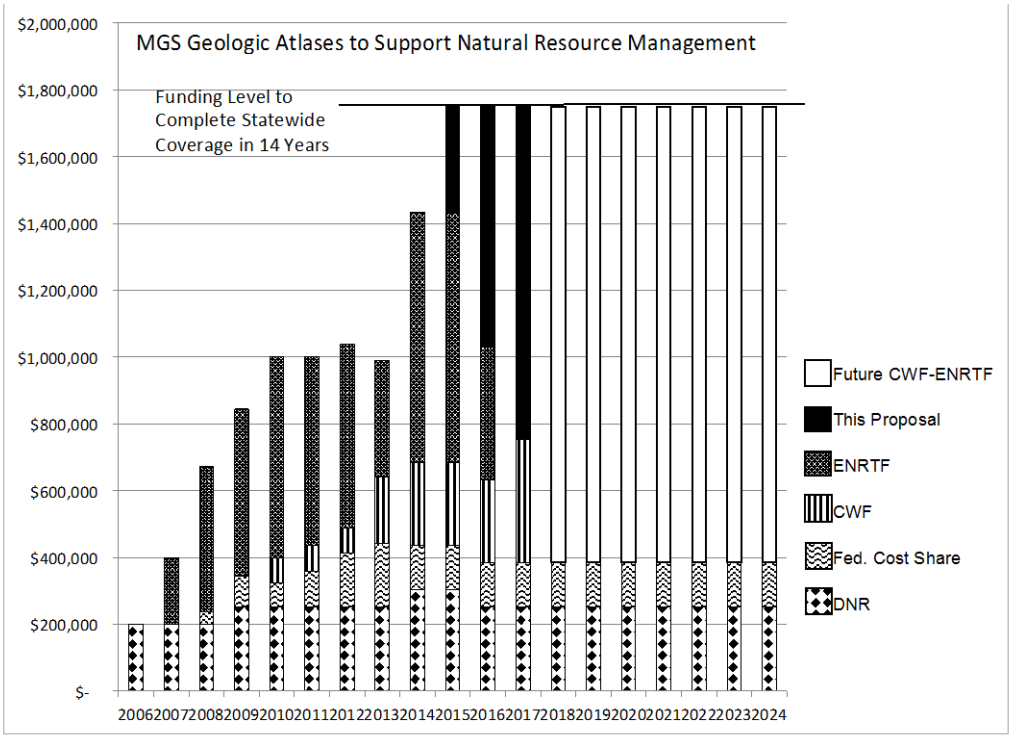
BUDGET ITEM	AMOUNT
Personnel: Between 15 and 20 MGS staff will be assigned to work on geologic atlases on a part time basis; chosen based on the skill sets necessary for the geology of the selected counties. The total effort averages about 3 FTE per atlas or about 18 FTE for this proposal. The cost includes the University benefits (37%).	$ 1,504,500
Contracts: rotasonic test hole drilling (awarded by a competitive bidding process). Generally 3-6 holes per county, based on 3 counties. Rotasonic method yields 4" undisturbed core of unconsolidated deposits. Rates increase from $30/ft near surface to $60/ft at depths exceeding 350'.	$ 258,333
Contracts: printing (awarded by a competitive bidding process); typically 1000 copies each of 6 map plates per county; 5 counties; maps are about 3' by 3'. Total 30,000 prints. Print runs have been reduced with more digital users.	$ 75,000
Equipment/Tools/Supplies: sample bags, batteries, augers, Giddings Probe repair parts, maps, core boxes	$ 51,000
Travel: food and lodging for field personnel in accordance with University reimbursement rules	$ 151,167
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 2,040,000

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State $ Being Applied to Project During Project Period: MGS will compete for federal cost share dollars annually. These federal funds cover half of the costs of each map product produced within a one year window. We intend to try to cost share at least five of the map products associated with this proposal. Funding might be $100,000 to $165,000 over life of project.	$ 140,000	pending
Other State $ Being Applied to Project During Project Period: The MGS CGA program anticipates approximately $700,000 from DNR during this period, but this will be applied to separate CGA projects. MGS has also received $1,230,000 from Clean Water Funds in the period 2011-2014 for atlases which we are applying to Hennepin, Isanti, Cass, and other counties.	$ 700,000	pending
In-kind Services During Project Period: Each of the participating counties will be asked to establish accurate locations for water wells with construction records in the county. This dollar value is only an estimate of their costs, and will vary depending which counties are selected.	$ 120,000	pending
Funding History: ENRTF 2007-2014 $3,952,199; CWF 20010-2014 $674,000; DNR 2007-2014 $2,155,694; Fed cost-sharing 2008-2013 $663,791. See line below and graph of funding history attached.	$ 7,445,684	Obligated to work underway or completed
Remaining $ from Current ENRTF Appropriation: $308,710 from M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 03b1 dedicated to Meeker, Redwood, Brown CGAs; $1,114,100 from M.L. 2013, Chap.52, Sec. 2, Subd. 3 dedicated to Wadena, Becker, and Hubbard CGAs . These figures are accurate as of March 2014 and will change.	$ 1,422,810	Obligated to work underway

County Geologic Atlas Part A Status, March 2014





MGS Geologic Atlases to Support Water and Mineral Management

Project Manager: Dale R. Setterholm

Qualifications:

Education

MS in Management of Technology, Carlson School of Management
University of Minnesota, Minneapolis, MN, 1999

Capstone Project: *A Project Management System for the Minnesota Geological Survey*

BS in Geology, Institute of Technology, University of Minnesota, Minneapolis, MN 1979

Professional Experience

Geologist, Minnesota Geological Survey, 1979-2014
Assistant to the Director, Minnesota Geological Survey 1997-2006
Associate Director, Minnesota Geological Survey 2007-2014

Participate in strategic planning, budget development, program administration, project management, personnel administration, purchasing, facilities management, information systems planning, search and hiring procedures, contract development, grants administration, and client relations.

Geologic interests and experience include:

- building subsurface geologic databases and applying them to geologic mapping and water resource management.
- the relationship of geologic settings and ground water sensitivity.
- the influence of geologic settings on water levels and water quality in lake management.

Organization Description:

The Minnesota Geological Survey is the geologic mapping agency for the State of Minnesota, as directed by its enabling legislation. Its goal is to produce comprehensive geologic mapping and related databases statewide at a scale of 1:100,000 or more detailed. This mapping supports informed land use management and decision-making that protects and wisely allocates resources. The MGS is part of the N.H. Winchell School of Earth Sciences in the College of Science and Engineering at the University of Minnesota. It has existed since 1872 and has a current staff of approximately 32.